

# PATENT ABSTRACTS OF JAPAN

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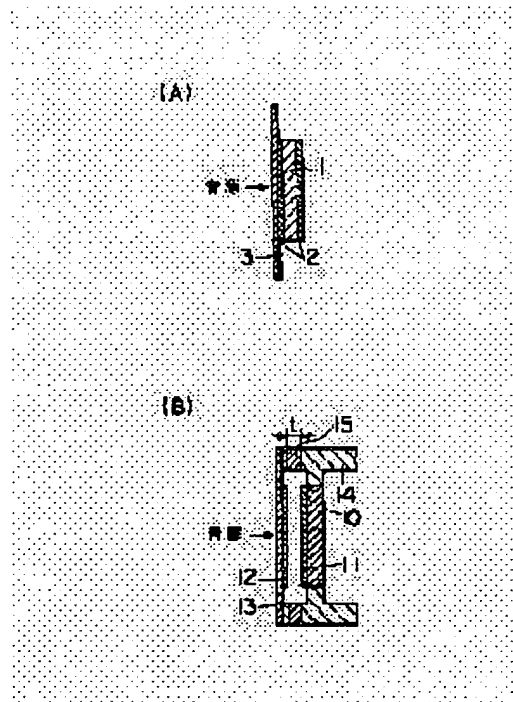
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## (54) TRANSPARENT MICROPHONE

### (57)Abstract:

PURPOSE: To provide the transparent microphone with a transparent structure free from the sense of incongruity and with the improved function by improving the human interface of the microphone to be used.

CONSTITUTION: A transparent electrode 2 is evaporated on both main surfaces of a disk transparent porcelain 1 of a PLZT ceramic. After the polarization, it is made a piezoelectric body and it is attached concentrically to a glass vibrating board 3 to provide an asymmetric bimorph transparent microphone. After the PLZT ceramic is polarized in a transparent short cylinder holder 14, a back pole board 10 which is electrated by evaporating a 1st transparent electrode 11 is arranged on the only positive electrode. A transparent vibrating board 13 with a 2nd evaporated transparent electrode 12 is attached on the cylinder end. A prescribed interval between the 1st electrode 11 and the 2nd electrode 12 is made by a spacer 15. Thus, the back electrated capacitor type transparent microphone can be obtained.



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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Industrial Application] This invention relates to amelioration of the microphone used in a common audio system device, an image sound system instrument, etc., makes with the microphone of a bimorph mold or an electret condenser type by the transparent material, and raises a function, for example, can improve the human interface in the above-mentioned system instrument, and relates to the transparency microphone aiming at amplification of an application.

[0002]

[Description of the Prior Art] if the microphone currently used from the former is classified according to the class of electroacoustic transducer -- an electrodynamic type and electromagnetism -- there are a mold, a magnetostriction mold, an electrostatic type, a piezo-electric mold, an electrostriction mold, a contact resistance mold, a variable-resistance mold, etc. In these converters, the energy conversion ingredient used an electrodynamic type -- a magnet, a coil, and electromagnetism -- the capacitor by which a magnet and an electrostatic type consist of a metal metallurgy group thin film in a mold and a magnetostriction mold -- According to many applications, such as engine performance, a property, etc. that carbon powder and a variable-resistance mold are distorted resistance wire, and they are required since they have the various descriptions in an electroacoustic transduction property, respectively, a piezo-electric mold is selected suitably and electrostriction porcelain and a contact resistance mold are used [ the mold ] for piezoelectric ceramics and an electrostriction mold.

[0003] Human being pronounces by the mouth, seeing that to which it is going to hear a sound or a sound carries out, and looking at a partner's expression also in human beings' conversation, although seen by the eye, and hears a partner's voice with a lug. for example, an image sound system instrument - - although it is necessary for the shaft of an image and an image to be in agreement to a viewer if it is -- the conventional image sound system instrument -- if it was, it was not able to be made thoroughly in agreement from a microphone being opaque, the image shaft of an image pick-up unit or a display unit, and the sound-collecting equipment of an image, i.e., the image shaft of a microphone

[0004] Then, parallel were made to adjoin an image shaft, i.e., an optical lens system, and the recorded sound data was digitized and was changed to necessary so that it might be audible in accordance with the image shaft of an indicating equipment at the time of playback, and the simple sound source microphone has been arranged and it worked on reproducing with various loudspeakers using the sound effect etc.

[0005]

[Problem(s) to be Solved by the Invention] On the other hand, the applicant proposed the transparency loudspeaker of a configuration of having attached transparency piezoelectric ceramics, such as PLZT, in the uni-morph mold or the bimorph mold to the thin film of glass or plastics previously for the purpose of offer of loudspeakers which can add the function of a loudspeaker while the article has been an original function variously, such as a building, a furniture, and accessories, (JP,4-2297,A, JP,4-70100,A). The above-mentioned transparency loudspeaker was able to be used as for example, an

announcement loudspeaker in the condition that a loudspeaker unit is not recognized at all, without interrupting a field of view, when it was used having stuck on the glass door, the windowpane, etc. [0006] By the way, when standing on the viewpoint of the human interface of an above-mentioned image sound system, and an image shaft and an image shaft are not in agreement in two-way communication with an image pick-up unit and the other party is reproduced, when it reproduces later on, sense of incongruity will be memorized in an individual youth. Moreover, in a display unit, when facing to the display seen now, in order to check the location of a microphone, it will let a display out of sight, or will search by groping, and disadvantage and sense of incongruity will be memorized. Furthermore, since sense of incongruity will be memorized in the same situation as \*\*\*\* by the conventional sound system when talking to through a window [ , such as glass, ], and a microphone talks that it is before it being conscious of this and serves as an unnatural conversation to record conversation, if there is a transparence microphone, an above-mentioned problem will be solved.

[0007] This invention improves the human interface of the transparence structure which does not make it conscious of the sense of incongruity at the time of an activity, or using it, nothing, and the microphone used, and aims at offer of the transparence microphone which the function was raised and aimed at amplification of an application.

[0008]

[Means for Solving the Problem] This invention is a transparence microphone characterized by being the bimorph mold component of the symmetry mold which carried out the laminating to the transparence diaphragm which consists of transparence piezoelectric ceramics which patternized the transparent electrode to both the principal plane side, or consists of a transparent material further, or an asymmetrical type.

[0009] Moreover, this invention is a transparence microphone characterized by making the 1st transparent electrode which patternized the transparent electrode on the transparence piezoelectric-ceramics front face, and the 2nd transparent electrode which patternized the transparent-material electrode on transparent glass, resin, or porcelain with an electret capacitor by the configuration which carried out opposite arrangement at intervals of predetermined.

[0010] On the other hand in this invention, laminated structures, such as an asymmetrical type of a transparence diaphragm which carried out the laminating to the field, can be used for a bimorph mold component for the symmetry mold which carried out the laminating of the transparence piezoelectric ceramics of two sheets, the symmetry mold which carried out the laminating of the transparence piezoelectric ceramics of two sheets to both sides of a transparence diaphragm, or the transparence piezoelectric ceramics of one sheet. In the above-mentioned configuration, LiNbO<sub>3</sub> besides PLZT (Pb-La-Zr-Ti system porcelain) and Bi<sub>12</sub>SiO<sub>20</sub> grade can be used for transparence piezoelectric ceramics, and 0.05mm - 1mm of thickness is desirable, and it is about 0.1mm preferably. Moreover, In<sub>2</sub>O<sub>3</sub> and SnO<sub>2</sub> (common name ITO) can be used for a transparent electrode, and about 500Å of thickness is desirable. Resin, such as glass, acrylic resin, and a polycarbonate, can be used for a transparence diaphragm, and 0.05mm - 1mm of thickness is desirable, and it is about 0.1mm preferably. Or although a baffle plate and a sound box are used further, it is desirable to use a component like the above-mentioned transparence diaphragm.

[0011] In this invention an electret condenser type microphone The transparence piezoelectric ceramics for electrets are prefaced to a sound source. A diaphragm and nothing, The front electret mold which carried out clear glass, resin, or porcelain after [ every ], and was used as the back electrode plate, Clear glass, resin, or porcelain is prefaced to a sound source, and it is suitably selected according to the property that the back electret mold which carried out nothing and the transparence piezoelectric ceramics for electrets to the diaphragm after [ every ], and was used as the back electrode plate is required, and an application. Any above-mentioned configuration can adopt the configuration of equipping a transparence resin electrode holder through a transparence resin spacer so that a transparent electrode may be prepared in the opposed face of a diaphragm and a back electrode plate and both transparent electrode may counter through a predetermined opening. In the above-mentioned configuration, LiNbO<sub>3</sub> besides PLZT (Pb-La-Zr-Ti system porcelain) and Bi<sub>12</sub>SiO<sub>20</sub> grade can be used

for transparence piezoelectric ceramics, and 0.5mm - 2mm thickness of thickness is desirable as 0.01mm - 0.05mm and a back electrode plate as a diaphragm. Moreover, In  $2O_3$  and  $SnO_2$  (common name ITO) can be used for a transparent electrode, and about 500Å of thickness is desirable. SODA glass well-known to the clear glass used as a diaphragm or a back electrode plate etc. can use transparent materials, such as an alumina and a titania, and said transparence piezoelectric ceramics for resin, such as acrylic resin and a polycarbonate, and transparence porcelain at transparence resin, and its 0.5mm - 2mm thickness is desirable as 0.01mm - 0.05mm thickness and a back electrode plate as a diaphragm.

[0012]

[Function] Although the function as a microphone is equivalent to the former, to image equipment, the transparence microphone by this invention is the transparent body, and it becomes possible to make an image shaft and an image shaft in agreement of it, and it does not make it conscious of the sense of incongruity at the time of an activity, or using it by being arranged in front of those optical system.

[0013]

[Example] The example 1 presentation La/Zr/Ti ratio produced the disc-like transparence porcelain 1 with a thickness [ of 100 micrometers ], and a diameter of 30mm with the PLZT porcelain of 8/65/35, after vapor-depositing the transparent electrode 2 which consists of ITO further to both the principal planes of the transparence porcelain 1 by 500Å thickness, it polarized, and it made with the piezo electric crystal (piezoelectric ceramics). This was made to rival in the shape of a said alignment in the diaphragm 3 made from soda glass with a thickness [ of 70 micrometers ], and a diameter of 60mm, as shown in drawing 1 A, and the unsymmetrical bimorph mold transparence microphone by this invention was obtained. (Co about 300 nF(s))

The frequency of the obtained bimorph mold transparence microphone and a sensibility property are almost flat at 200Hz - 3kHz, and voltage sensitivity is [ about ]. -It was 55dB. When this microphone was installed in the front face of the so-called graphic display device of a karaoke system, the tone quality which can sing automatically, not caring about the location of a microphone but looking at a display, and is acquired was what is not inferiority as compared with the conventional thing. When talking within and without the space covered with the glass window, it was able to talk aligning the other party and a look with this glass window by attaching the above-mentioned microphone.

[0014] The example 2 presentation La/Zr/Ti ratio produced disc-like transparence porcelain with a thickness [ of 1.2mm ], and a diameter of 30mm with the PLZT porcelain of 8/65/35, vapor-deposited the 1st electrode 11 of transparence which is from ITO only on an after [ polarization ] positive-electrode side by 500Å thickness, and formed the electret-ized back electrode plate 10. The 2nd electrode 12 of transparence of the transparence BORIKABONETO film of 10-micrometer thickness which becomes a field from ITO by 500Å thickness on the other hand was vapor-deposited, and the diaphragm 13 was produced. As shown in drawing 1 B, the back electrode plate 10 has been arranged in the electrode holder 14 of the shape of a short cylinder which consists of transparence BORIKABONETO, the diaphragm 13 was stretched to the cylinder end face, and it has arranged through the spacer 15 which consists of a transparence BORIKABONETO film so that 25 micrometers of spacing t of the 1st aforementioned electrode 11 of transparence and the 2nd electrode 12 of transparence may become, and the back electret condenser type transparence microphone by this invention was obtained. (Co about 250 nF(s))

The frequency of the obtained condenser type transparence microphone and the sensibility property are almost flat at 30Hz - 10kHz, and voltage sensitivity is [ about ]. -It is 50dB. However, since the impedance was about 21 M omega, magnification amplifier was required for it. When mounting \*\*\*\*\* of the above-mentioned microphone was carried out in the front face of the lens of image pick-up units, such as TV board equipment and a camcorder/movie, it could talk automatically, having not cared about the location of a microphone but looking at a camera, and the image shaft and the image shaft were in agreement in the repeat display equipment of the other party, and sense of incongruity was not made to be memorized with TV board equipment. Moreover, with camcorder/movie equipment, when it reproduced after photograph, the image was formed so that it might be transmitted from the direction of the photographic subject itself, and the playback screen has been experienced automatically without

sense of incongruity. In addition, although FET of a microphone used and arranged the transparent electrode out of the visual field of an image pick-up unit in the example, according to an application or a configuration, it can arrange in various locations.

[0015] When discharging the acoustic wave by which the amplitude is the same and phase components differ 180 degrees to the acoustic wave discharged from example 3 sound source with another means on the same image shaft, the well-known principle was applied to the physics target of disappearing the acoustic wave discharged from the sound source, and the noise stripper was produced. That is, the condenser type transparence microphone produced in the example 2 was attached in the outside of the windowpane of a building, and it became calm space when it was used, the configuration which discharges with amplifier the sound which the interior-of-a-room side carried out windowpane attachment of the conventional bimorph mold transparence loudspeaker mentioned above, and inputted the noise from a microphone into the phase transducer, and carried out phase changeover about 180 degrees on the same image shaft as the noise from a bimorph mold transparence loudspeaker, nothing, and. When the equipment of a configuration had been similarly arranged on the partition glass between passenger-car [ the so-called limousine type of ] order seats, the conversation by the side of a back seat stopped moreover, being able to hear at all by the front seat side.

[0016]

[Effect of the Invention] Amplification of an application is attained, as the transparence microphone by this invention is the transparence structure which does not make it conscious of the sense of incongruity at the time of an activity, or using it although the function as a microphone is equivalent to the former, improves the human interface of the microphone used and shows an example.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The transparence microphone characterized by being the bimorph mold component of the symmetry mold which consists of transparence piezoelectric ceramics which patternized the transparent electrode to both principal planes.

[Claim 2] The transparence microphone characterized by being the bimorph mold component of the symmetry mold which carried out the laminating of the transparence diaphragm which consists of transparence piezoelectric ceramics which patternized the transparent-material electrode to both principal planes, and a transparent material, or an asymmetrical type.

[Claim 3] The transparence microphone characterized by making the 1st transparent electrode which patternized the transparent electrode on the transparence piezoelectric-ceramics front face, and the 2nd transparent electrode which patternized the transparent electrode on transparent glass, resin, or porcelain with an electret capacitor by the configuration which carried out opposite arrangement at intervals of predetermined.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view showing one example of the transference microphone by this invention, and A shows a BAIMORUKU mold and B shows a condenser type.

[Description of Notations]

- 1 Transference Piezoelectric Ceramics
- 2 Transparent Electrode
- 3 Diaphragm
- 10 Back Electrode Plate
- 11 1st Electrode of Transference
- 12 2nd Electrode of Transference
- 13 Diaphragm
- 14 Electrode Holder
- 15 Spacer

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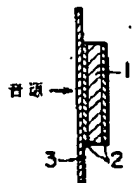
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DRAWINGS

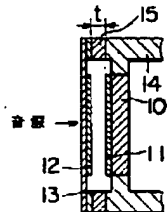
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[Drawing 1]

(A)



(B)



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[Translation done.]